

## Hysteresis Loops Study on an Exchange Biased NiO/Co Bilayer

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Beamline(s): X13A

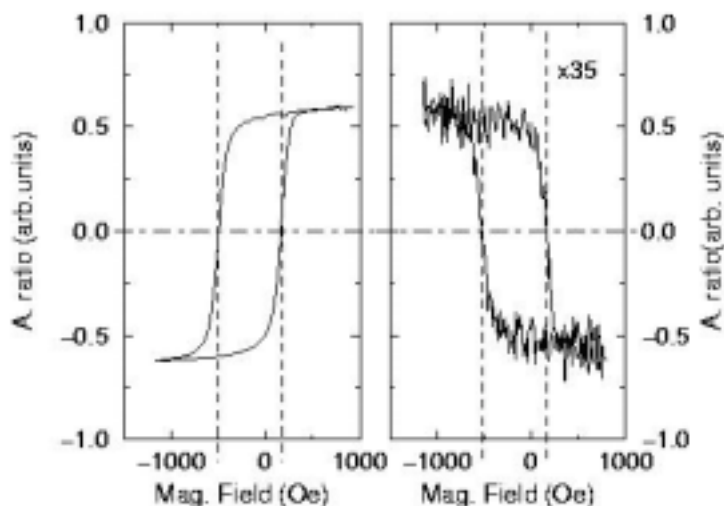
**Introduction:** Circular polarized light had demonstrated to be useful to study magnetic properties. Using the sum rules is possible to obtain the magnetic moment associated to single elements present in the sample.

**Methods and Materials:** We have study a Co(3 nm)/NiO(50 nm) exchange biased bilayer using the X-13 elliptically polarizing wiggler source switching with 2~Hz between left and right elliptically polarized light. The switching source allows using phase sensitive detection to record element sensitive hysteresis loops.

**Results:** The figure shows the hysteresis loops recorded at the Co and Ni L3 absorption edge at 20 degrees scattering angle. The incident photon energy was selected where the magnetic circular dichroism presents a maximum. Ni hysteresis loop has been scaled (35 times) and shifted in order to be represented in Co scale. Both hysteresis loops present the same exchange bias as well as the same coercive field. The curves show the presence of some amount Ni spins unbounded to the NiO antiferromagnetic phase. The opposite orientation in the curve shape demonstrates an antiferromagnetic coupling between the Co and the Ni spins.

**Conclusions:** The hysteresis loop study has showed the strong correlation between the Co and Ni spins, coupled antiferromagnetically.

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**Figure 1.** Element sensitive hysteresis loop recorded at the L3 Co (left) and Ni (right) absorption edge